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Graphical Basis Of Girikh Used In Traditional Applied Decorative Art Of Central Asia In The 9-15th Centuries.

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Annotation. In this article, the process of using effective methods and designing engineering graphics in the teaching of Sciences for the purpose of wide application of geometrical patterns of Central Asian scientists of 9-15th centuries in the fields of National Art and architecture and the basis of girikh patterns, application of several methods in modern architecture, construction and restoration is analysed.

Keywords. Girikh, geometry, AutoCAD, pargor, islimi, gypsum, ornament.

1. INTRODUCTION.

Girikh patterns were widely used in many areas of Central Asian Art in the 9-15th centuries. For example: it was used in architecture, wood carving, gypsum carving, embroidery, copper carving, as well as in many other areas. Even today, the processes in this industry are reflected in modern appearances by artarmadla rarchitectors and representatives of many production sectors without losing their nationality.

Main part.
Indeed, independent Uzbekistan has a very ancient and rich history of science. It is known that our world-known ancestors Al-Khorezmi, Farabi, Ibn Sina, Beruni, Ulughbek and others made great contributions to the world scientific development by writing invaluable national wealth, scientific treatises in various disciplines.
Among the famous scientists in this area it is necessary to mention craftsmen, engineers whose names are not known. Historical architectural monuments, unique items of folk art, images in historical hands, which are the images of our homeland, were created by people who were educated in the science of "geometry". In the 9-15th centuries, the science of geometry in Central Asia served as the basis of the rules of geometry and drawing Sciences of the present-day drawing. Especially in Eastern architecture and Applied Art, the appearance of girikhs and the methods of their execution deserve attention. Patterns made up of polygonal and polygonal stars from incomparable lines that intersect each other seem to be the same patterns that flashed in the universe as they were in the story for centuries.
The Oriental, especially in the architecture, applied art of Central Asia, the patterns are mainly divided into two groups. Patterns consisting of plant elements–patterns consisting of wet and geometrical shapes - girikhs are a complex geometric pattern. Two types of patterns were also applied together. Girikh means in Persian, confused, knot, complex. As girikh, it is

said to patterns that consist of geometrical patterns and shapes. They are widely used in historical architectural monuments, wood and ganch carving, decoration of National Handicrafts, in modern architecture, which is widely used in decoration and people's practical efforts. These geometrical patterns have been studied scientifically and practically by many scientists and master craftsmen. Abu Nasr Muhammad Al Farabi (872-950) writes his book mentions that "The methods of spiritual mastery and the secrets of the natural delicacy of geometrical forms", which defines the basis of the architectural project as important methods of geometrical fabrication. In it, various geometrical shapes-circles, triangles, rectangles, squares, cubes, cones, cylinders, prisms, spheres, as well as methods of making parabolas and origines are emphasized. У . He wrote in his book book "al-Khiyal ar-ruhuniyma va asror at tabiiyya fida koik al-ashkal al-Khansiyya" in the phrase design of 10 books, 130 issues of geometrical construction are presented in different variants and the easiest ways to solve them are shown. A characteristic feature of the pherobic substance is that it considers three dimensions of height, eni and depth as vabelgisi. Since Farabi himself is well aware of the artistry, his work "science al-Khayal" has a very broad meaning, which includes both applied art and architecture. Accordingly, Al Farabi writes: "There are a number of geometric mohir methods, among which are rayisa-El-bina,that is, the art of guiding construction by the design of buildings and structures." Farabi's book "The people of virtue culture (city)" gives an idea of the composition of the city. Fazil likens the city to a healthy coin, dreams of creating conditions for people to live in. His research and views on architecture play an important role in the study of Central Asian architecture, including urban architecture. In addition, he wrote the masterpieces of Euclid's "Foundations", Ptolemy's "Almagest". His works, research shows that the development of graphics is directly important. A certain Khorasani, one of the great scientists who contributed directly to the development of the graph, is a mathematician Abul Wafa Muhammad ibn Yakhya ibn Abbas al Buzjani (940-998). He is primarily engaged in the translation of the works of ancient Greek scientists.

His scientific work, which he discovered, plays an important role in the further development of mathematics and Graphic Science. In his works, the basics of the theoretical works of drawing are given. His treatise, which consists of 13 chapters on geometrical geometric patterns for artisans, began with chapters titled "About the line", "About the circular and the triangle". It contains extensive information on these tools and how to make them. The content of this work was mainly devoted to geometrical constructions.

Abul Wafa Buzjani also goes through the techniques of making two parabola templates belonging to burning mirrors like Al-Farabi.

All masters want to apply girix in their works. Nevertheless since its solutions are not written down, this issue is a difficult night. I.Gaganov, doctors of science L.I.Rempel, M.S.There are scientific works of Bulatov on the geometrical patterns of Central Asia. However, since these works are in a broad scientific direction, it is difficult to understand girikh solutions. Secondly, very much compared to the number of girikhs available [6, 83-б]

3.Bositkhonov was engaged in research in the births of girikhs and discovered their various legalities. He is the author of a series of articles devoted to the mysteries of the art of girix. 3.Bositkhonov created about 400 girixs. Especially worthy of admiration is the search of the master about drawing girix into a circle[6, P.4]

Bobokhonov Abdulla Bobokhonovich (1910-1990.10.6) architect of the people. He taught his knowledge and experience to young architects in 1963-89 years. Basic works: Kattakurghan (1940-1941) and Southern Surkhan (1964-1967) is an architectural part of the complex of reservoirs. Hamza mausoleum in Shakhimardan (1950), Ulugbek observatory in Samarkand (1962) and others. In the buildings built on the basis of Bobokhonov projects, which created the project of more than 100 Cultural Palaces, cinemas and residential

buildings, national architectural traditions are harmonized with modern architectural styles[8, P.26].

Shirin Muradov (1879-1957) architect, gypsum engraver: honorary member of the Academy of Sciences of Uzbekistan (1943), art figure served in Uzbekistan (1943). Sitorai Mokhi of Bukhara Emir participated in the decoration of the White Hall of the Summer Palace of Khosa, the palace in Karmana and participated in the repair and decoration of other buildings. Master Shirin Muradov skillfully applied the traditions of gypsum carving in his work, enriched them with new content and forms [8, P.54].

P.Zahidov's "Architect's world", "Zeb ichra ziynat", S.S.Bulatov, N.A.Ashirova "A brief Dictionary of Applied Art"; S.S.Bulatov's "Explanatory Dictionary on the terms of gardening, ornamentation and wood carving"; S.S.Bulatov's "Folk applied decorative art", E.I.Ruziyev in the scientific work of and other scientists, it is possible to meet a lot of geometrical patterns.

Figure 1.

The basis of the pattern consists of triangular, rectangular, circular and arc-shaped distributions. Geometrically analyzing girikh, drawing, creating new species requires special training and skills. Girikhs were simple in the period of their creation, which later improved and became more complicated. No matter how complex the Girikh has forms, it also has its convenient side: any girih is divided into certain pieces (distributions), which are repeated. The carvings become beautiful, attractive, becoming more and more repeated.

Thanks to this, it is possible to re-decompose a complex girih, consisting of some simple girih, to make a few simple and independent girih, to create a third kind of girih by interlacing the two girihs.

Girikhs, depending on their shape, are named differently: "pargori girikh", drawn using a circular (pargor), if on the basis of the distribution there is a star with 5 and 10 sides, then "**pargori girikh**" and etc.

Preserved architectural monuments, items of fasting (barkash, obdasta, lagan, ceramic dishes, carpet, clove. Girikh nakshi lot three in gilding, book decorations and modern furniture). Especially among the architectural decorations girikh takes the leading (the second in the wart pattern) place. Finding the key to making girihs in architectural monuments often

requires much more laborious work. Miniaturist, girikh scientist Master Z.Bositkhonov restored many (more than 300) girikhs and found ways to build them and created new ones.

It is not known when, where girih came into being. Among the architectural monuments in the territory of Central Asia, in particular, the Arabata mausoleum in the 10 century (Samarkand region), Mirsaid Bahrom (Karmana), caravansaray of Raboti Malik (Navoi), Juma masjidi (Khiva), Afrosiab (Samarkand) in the 12 century, Palace of Termizshakhs, Masjid Alon (tower, 12-century, Bukhara), Khoja Ahmad Yassavi complex in the 15-16th centuries (Turkistan), Ulughbek in Registan Square, many buildings in Sherdor, Tillakori madrassas, Bibikhanim mosque, Shahizinda ensemble are decorated with greenery, Baroqkhon madrasa, Zangiota mausoleum (Tashkent), Khudayarkhon Palace and mosques (Kokand).

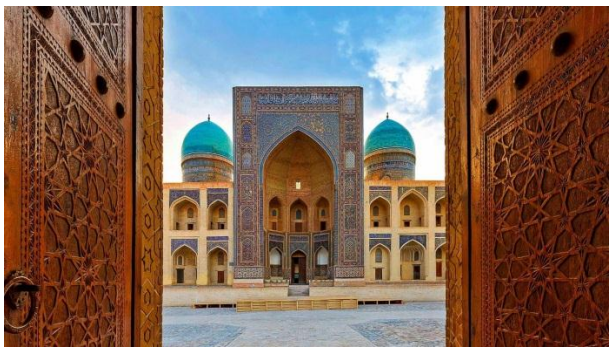
In the 10-11th centuries, only in gypsum, in the 12-th century in ceramic ware and felt (columns), in the 14th century in mosaics, parchin, wood, stone of Varangi patterns. By the 15 century, it was a painting to give mystery to the surfaces of ornaments carved on the chinaware. The possibilities of using girikh have expanded again.

Girikhs, which were used by Master Shirin Muradov, Shamsiddin Gafurov, Makhmud Usmanov and other masters of Uzbekistan in the 20th century to decorate buildings, are distinguished by their simplicity and beauty, splendor and perfection. Such examples of girih are the buildings of the theater, the Museum of the history of the peoples of Uzbekistan, the Palace of Friendship of Peoples, metro stations and so on. Can be seen at. In particular, the history of Timurids restored after the independence of Uzbekistan is characterized by large architectural structures, hotels, public places(teahouses, neighborhoods, etc.), such as the statehood, the building of the Oliy Majlis, The Palace of symposiums, etc.), became one of the main types of girih pattern in the decoration of private buildings.

It is our duty to restore the historical architectural monuments that have reached us thanks to independence and convey this rich cultural heritage to our future generations.

The restoration of such architectural monuments is being studied scientifically by our master architects, who know the architecture of that period, using geometrical constructions presented in the sources of Central Asian architecture of the 9-15th centuries.

We see that our historical monuments of architecture meet much more and more their appearance before and after independence, and the fulfillment of the geometrical constructions in them is restored with high taste and contemplation (Figure 2).



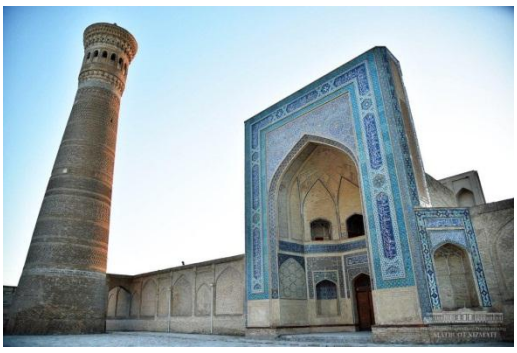


Figure 2.

In order to develop this sphere, the reconstruction and restoration of architectural monuments organized in the universities and higher educational institutions "in the direction of education architecture in the construction of buildings to preserve the original architectural monuments that have reached us from our ancestors to our ancestors and apply them in modern architecture by scientifically studying the geometrical patterns in them, the main goal is to

The history of architecture should not be limited to the development of monotonous. Functional construction technical ideological artistic, etc. History of architecture the development of multiples of human activity in connection with the development of society in general finds its effect in the architecture of community development forms.

Girikh is a complex pattern with strict legislation. Master copy in drawing, you can direct the turns to any side. If it is not acceptable, turn off the other direction fill the empty spaces with flowers, buds or leaves. So the master can become a master of his work in the drawing of islimi. Girikh is subject to girikh, which the master draws when drawing. Because each girikh is formed on the basis of geometric (geometrical) laws. Geometric patterns are very common in the countries of Central Asia and the Middle East. He pours splendor with his sophistication and clear legitimacy, exaggerated and restrained.

When decorating any structure, the islim with girikh is applied together, the first one is thrown into our eyes with girikh. Girikh in the composition is the leading one, and islimi is the filler. For this reason, in the composition, which is used together with girikh, islimi does not cross the line of the islimi girikh. Girikh stands in the first, islimi in the second plan.

To make girikhs, straightens the arcs and circles into equal parts. It is easy to divide the circle into six, twelve, or eight and sixteen. But it's a bit complicated to divide into ten, or five[6, P.6-7]

Sometimes it is necessary to draw a copy on one part of the circle. For example: there is no possibility to draw a whole on the ceiling of the room or on the wall a workable composition of its own size. In this situation, it is necessary to draw a circle of its own size (according to the request of girikh), for example, from one, eight to one, from sixteen to one or twelve.It should not be forgotten that the proportions of the distribution should be done in my gloves. Otherwise, the composition will break.

Therefore, it is desirable to have andaza form. Below we will see how to draw circles from eight to one, from ten to one and from sixteen. To do this, dividing the foyadalanılsa from modern computer graphics software into corners and symmetrical copying is much easier than manual and saves time.

The performance of the geometrical legalization of girikh patterns using graphical applications increases the efficiency. We will consider the execution of several girix patterns through a graphical program (with the help of AutoCAD graphics program):

2. DISCUSSION.

Circle regular three, four, five, six, seven, then G. to divide, the following sequence of actions is performed.  -(polygon) the command is selected and the number of equal parts is entered, and the ENTER key is pressed, then the Left Mouse roof is pressed and one of the rows in the window is selected (the top of the rows in the window contains the other part of the circle, and the bottom row contains the outer part of the circle with equal regular angles. The remaining all regular polygons are shown only in dimensions and sides using such a layout even in the handrail (Figure 3). It is possible to divide the circle into equal parts, placing it in any dimensions and corners or corner parts. Simultaneously, can be placed symmetrically together. [9, P.152-154]

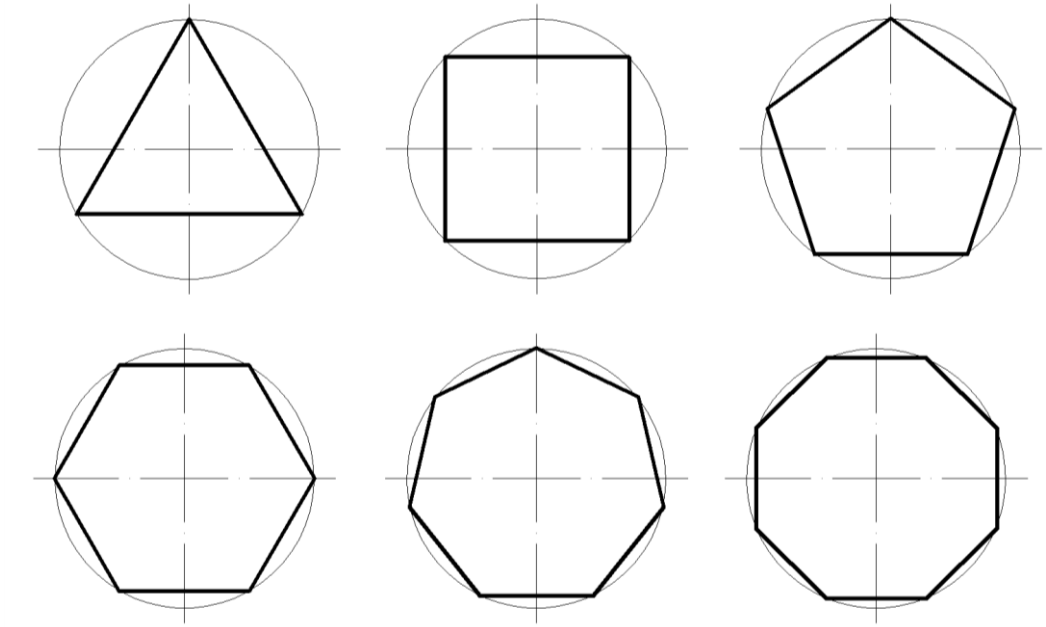


Figure- 3.

In 4-th form, we consider the execution of girikhs. It is necessary to fold this drawing three times, in the square we pass the diagonal of **BD**, three light lines from points A and C are drawn along the intersecting lines **1, 2, 3, 4, 5, 6** creates points. Now, depending on the drawing, we make the lines that make the girikh, creamy (Figure 4). [6, 18-б]

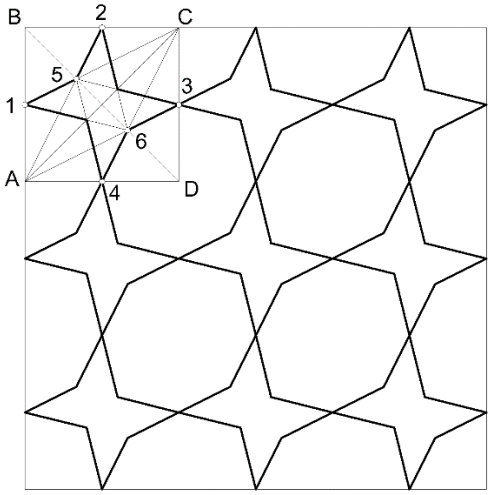


Figure 4.

We pass the **BD** diagonal to the square we draw an arc from the point at the **AB** by radius we try to draw an arc from the point **DA** and **B** we find the points a and b by drawing an arc. We measure **AB** from point **B** and find the point **n**. Then we transfer lines from points a and b through points n we connect the arcs diagonally with the intersection point A and B (Figure 5) [6, P.19-b]

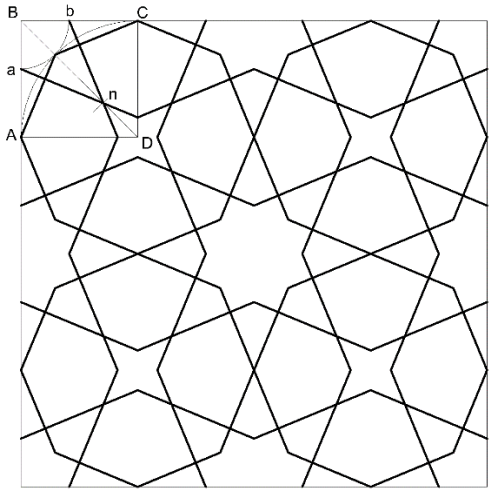


Figure 5.

We draw **A** parallel lines from 1 and 2 points to as we draw parallel lines from **E** and **F** to as we find 3 and 4 points and then through 3 and 4 points we pass horizontal lines both vertically and horizontally we pass the line **BD** in the area where the **AC** crossed **BD** is broken. Even before 4 and 3 points, the line is broken (Figure 6) [6, 29-b]

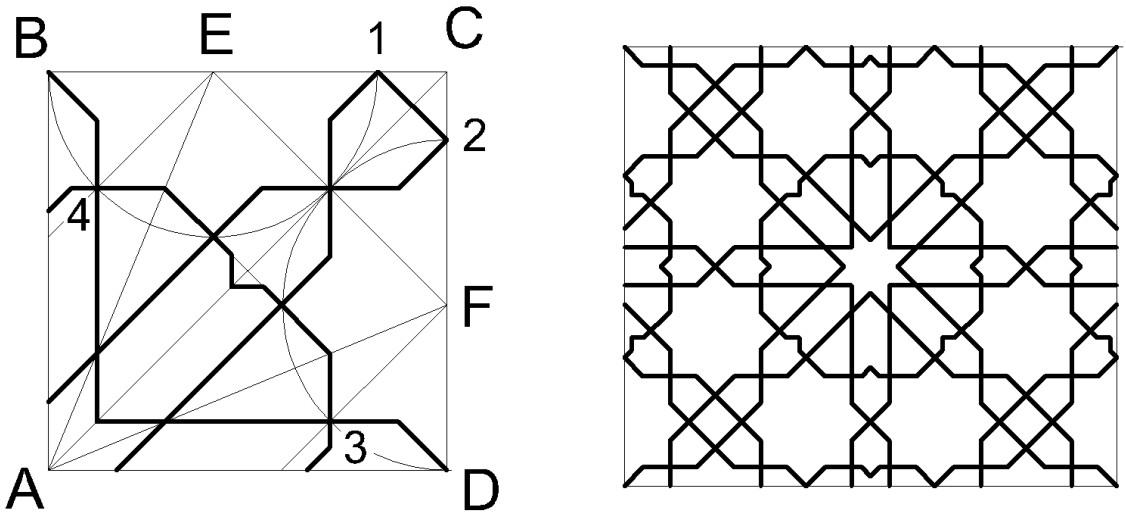


Figure 6.

3. CONCLUSION.

It is worth noting that "In engineering graphics and secondary school drawing textbooks and reading literature, which are now studied in Higher Educational Institutions, no information on the subject is included. In our opinion, the materials on the topic will be relevant if they are studied in the curriculum of "Architecture and construction" education of

higher educational institutions. Then, the students who graduated from these directions become specialists whose skills and skills are formed to create projects that harmonize the traditions of National Architecture formed over the centuries with modern architecture.

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